

REMARKS

Claims 1-5, 11-13, 16, 19-21, 23-26 and 31-34 are pending herein.

1. Claims 1-5, 11-13, 16, 19-20, 23-26 and 31-32 were rejected under §103 over Grabmaier et al. in view of Robinson et al. This rejection is respectfully traversed for the following reasons.

The PTO has continued to rely upon Grabmaier et al. for disclosure of a Czochralski process, and on the secondary reference to Robinson et al. for teaching of slicing. The PTO again acknowledges that the references do not disclose a process aspect ratio not less than 0.44, as claimed. The PTO continues to take the position that the claimed aspect ratio would have been obvious to “maximize the size of the crystal because larger crystals are more desirable.” As pointed out in Applicants’ prior responses, the art of record nowhere teaches or even remotely suggests “optimizing” process aspect ratio to achieve such large size crystals. Again, the PTO is directed to the Rule 132 Declaration previously filed, executed by Dr. Milan Kokta. Dr. Kokta is a co-inventor on the present application, and is deeply experienced in the field of melt-based single crystal growth technologies, having engaged in research and development in this field for 35 years. As Dr. Kokta clearly points out, generally large size boules (crystals) are achieved through scaling the mass of the melt and crucible, not by increasing the size of the boule relative to the mass of the melt and crucible. This simplistic approach, increasing boule size for a given melt/crucible has been found to deteriorate crystal quality.

In an attempt to bolster the PTO’s assertion that it would have been obvious to optimize process aspect ratio to be greater than 0.44, the PTO directs Applicants to JP ‘989 (Michinori).

JP ‘989 discloses a Czochralski technique for forming gallium arsenide (GaAs) single crystal boules, and specifying a process aspect ratio within a range of 0.31 to 0.45. Foremost, Applicants respectfully submit that the description of process aspect ratio in JP ‘989 is specific to, and is limited to, a notably different crystal system, gallium arsenide. There is no teaching or even remote suggestion that the disclosed process aspect ratios have any relevance or would have any utility in context of growth of a spinel single crystal boule, according to the claimed invention. Moreover, Applicants submit that JP ‘989 indeed supports Applicants’ position that

the claimed method incorporating a minimum process aspect ratio of 0.44 is non-obvious. Clearly, JP '989 teach an upper limit of 0.45 with respect to growth of GaAs single crystals. Accordingly, JP '989 does not suggest modification of the Grabmaier et al. process to have large process aspect ratios, but rather, teaches that the process aspect ratio must be capped. Clearly, JP '989 does not support the PTO's view of "maximizing" crystal size based upon increasing process aspect ratio. Indeed, paragraph [0015] noted by the PTO clearly teaches that the upper limit of process aspect ratio of 0.45 is important to maintain quality crystals and high yield.

Furthermore, the attention of the PTO is drawn to claims 32 and 34. Claim 32 recites a minimum process aspect ratio of 0.52. Clearly, the prior art, including JP '989 does not suggest such a high process aspect ratio, and indeed, the prior art suggests the opposite, limiting process aspect ratio.

For at least the foregoing reasons, Applicants respectfully submit that the claimed invention would not have been obvious over Grabmaier et al. in view of Robinson et al. Accordingly, withdrawal of the §103 rejection over those references is respectfully requested.

2. Claim 21 was rejected under §103 over Grabmaier et al, Robinson et al. in further view of Li. Applicants submit that Li fails to cure the deficiencies of Grabmaier et al. and Robinson et al., and that this rejection should be withdrawn for the reasons advanced above.

3. Claims 1-5, 11-13, 16, 19-20, 23-26 and 31-32 were rejected under §103 over Cullen et al. in view of Robinson et al. Applicants submit that this rejection should be withdrawn for the reasons advanced above with respect to the Grabmaier/Robinson combination. The disclosure of Cullen et al. is no more relevant than Grabmaier et al. It is noted that the PTO continues to rely upon a "suggested" process aspect ratio according to FIG. 1 of Cullen et al. It is again emphasized that the PTO continues to ignore its own guidance under MPEP §2126, clearly stating that arguments based upon measurements from drawing features are of little value, and that proportions of elements shown in patent drawings cannot be relied upon unless accompanied by appropriate disclosure that the drawings are to scale, or otherwise intended to show accurate dimensionality. Clearly, the drawings of Cullen et al. are not indicated as such, and are more akin to "cartoons" typically used in patent applications.

For at least the foregoing reasons, Applicants respectfully submit that the presently claimed invention would not have been obvious over Cullen et al. in view of Robinson et al. Likewise, the additional rejection over claim 21 in further view of Li should also be withdrawn for the foregoing reasons.

Applicants respectfully submit that the present application is now in condition for allowance. Accordingly, the Examiner is requested to issue a Notice of Allowance for all pending claims.

Should the Examiner deem that any further action by the Applicants would be desirable for placing this application in even better condition for issue, the Examiner is requested to contact Applicants' undersigned attorney at the number listed below.

The Commissioner is hereby authorized to charge any fees, which may be required, or credit any overpayment, to Deposit Account Number 50-3797.

Respectfully submitted,

Date

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